

**Listing of Claims:**

1. (Currently Amended) An optical DNA sensor comprising:  
a solid imaging device, and which is configured to have a  
plurality of types of DNA probe probes each including a different  
nucleotide sequence and being arrayed and fixed on a surface of  
5 the solid imaging device;  
a plurality of photoelectric elements provided in the solid  
imaging device; and  
a transparent conductive layer which is provided in the  
solid imaging device between the DNA probes and the plurality of  
10 photoelectric elements, and to which a voltage is applied to  
attract a nucleotide strand.

Claims 2 and 3 (Canceled).

4. (Currently Amended) The optical DNA sensor as claimed in  
claim 2, wherein each of the photoelectric elements is of  
comprises a field effect transistor type having which has a  
semiconductor layer which that generates electric charges by  
5 receiving light.

5. (Currently Amended) An optical DNA sensor comprising:  
a solid imaging device,

an excited exciting light absorbing layer which absorbs exciting light, and which is formed on a surface of the solid 5 imaging device, and which is configured to have a plurality of types of DNA probe probes each including a which include nucleotide sequence and are aligned and fixed on the excited exciting light absorbing layer.

10 a plurality of photoelectric elements provided in the solid imaging device, and

a transparent conductive layer which is provided in the solid imaging device between the DNA probes and the plurality of photoelectric elements, and to which a voltage is applied to attract a nucleotide strand.

6. (Currently Amended) An optical DNA sensor comprising:  
a solid imaging device, a transparent conductive layer which is formed on a surface of the solid imaging device and has a charge density of 1.0.times.10.sup.20 [1/cm<sup>3</sup>] or less, and 5 which is configured to have a plurality of types of DNA probe probes each including a which include nucleotide sequence and are aligned thereon;

a plurality of photoelectric elements provided in the solid imaging device; and fixed on the

10       a transparent conductive layer which is provided in the  
solid imaging device between the DNA probes and the plurality of  
photoelectric elements, and to which a voltage is applied to  
attract a nucleotide strand, wherein the transparent conductive  
layer has a charge density of  $1.0 \times 10^{20}$  [cm<sup>-3</sup>] or less.

7. (Currently Amended) An optical DNA sensor comprising:  
a solid imaging device;  
a dielectric multilayered film comprising a plurality of  
types of dielectric layers with each having refractive indexes  
5       different from each other, wherein the dielectric layers which  
are alternately laminated on a surface of the solid imaging  
device [[,]] and an optical film thickness of each of the  
dielectric layers being is equivalent to one fourth of a  
wavelength of a phosphor-exciting light, [[;]] and wherein the  
10      dielectric multilayered film is configured to have a plurality of  
types of DNA probe probes each including a which include  
nucleotide sequence and are aligned and fixed on the dielectric  
multilayered film thereon;  
          a plurality of photoelectric elements provided in the solid  
15      imaging device; and  
          a transparent conductive layer which is provided in the  
solid imaging device between the DNA probes and the plurality of

photoelectric elements, and to which a voltage is applied to attract a nucleotide strand.

8. (Currently Amended) An optical DNA sensor comprising:  
a solid imaging device comprising: having a transparent substrate;

a plurality of photoelectric elements which are arranged  
5 apart from each other on a surface of ~~a~~ the transparent substrate  
and which include a bottom gate electrode ~~21~~ having a shading  
property, a semiconductor layer having a light sensitivity, and a  
light-transmissive top gate electrode, wherein the bottom gate  
electrode, the semiconductor layer and the light-transmissive top  
10 gate electrode which are layered in order on the transparent  
substrate; ~~in this order~~; and

a light-transmissive protective layer for coating which  
coats the plurality of photoelectric elements, ~~[[;]]~~ and which is  
configured to have a plurality of types of DNA probe probes each  
15 including a ~~which include~~ nucleotide sequence ~~and are aligned and~~  
~~fixed on the protective layer thereon; and~~

a transparent conductive layer which is provided in the  
solid imaging device between the DNA probes and the plurality of  
photoelectric elements, and to which a voltage is applied to  
20 attract a nucleotide strand.

9. (Currently Amended) A DNA reading apparatus comprising:  
an optical DNA sensor comprising a solid imaging device ~~7~~  
~~and which is configured to have~~ a plurality ~~of~~ types of DNA probe  
~~probes~~ each including a nucleotide sequence and being arrayed and  
fixed on a surface of the solid imaging device; and  
5 a driving unit ~~which is attachable to and detachable from~~  
~~the optical DNA sensor for attaching the optical DNA sensor~~  
~~detachably and for driving to drive~~ the solid imaging device;  
~~wherein the solid imaging device comprises a plurality of~~  
10 ~~photoelectric elements, and a transparent conductive layer which~~  
~~is provided between the DNA probes and the plurality of~~  
~~photoelectric elements, and to which a voltage is applied to~~  
~~attract a nucleotide strand.~~

10. (Currently Amended) A DNA reading apparatus comprising:  
an optical DNA sensor which comprises:  
a solid imaging device ~~which comprises:~~ ~~having a~~  
~~transparent substrate;~~

5 a plurality of photoelectric elements which are  
arranged apart from each other on a surface of ~~a~~ ~~the~~ transparent  
substrate and ~~which~~ include a bottom gate electrode having a  
shading property, a semiconductor layer having a light  
sensitivity, ~~and~~ a light-transmissive top gate electrode, ~~which~~  
10 ~~wherein the bottom gate electrode, the semiconductor layer and~~

the light-transmissive top gate electrode are layered in order on the transparent substrate; in this order; and

15       a light-transmissive protective layer for coating which coats the plurality of photoelectric elements, [[;]] and which is configured to have a plurality of types of DNA probe probes each including a which include nucleotide sequence and are aligned and fixed on the protective layer thereon; and

20       a transparent conductive layer which is provided in the solid imaging device between the DNA probes and the plurality of photoelectric elements, and to which a voltage is applied to attract a nucleotide strand; and

25       a light irradiation member for irradiating which irradiates a phosphor exciting light like a plane of light toward a rear surface of the transparent substrate of the optical DNA sensor solid imaging device.

11. (Original) A DNA reading apparatus as claimed in claim 10, wherein the light irradiation member is disposed below the optical DNA sensor.

12. (Currently Amended) A DNA reading apparatus as claimed in claim 11, wherein the light irradiation member irradiates the phosphor exciting light to the DNA probe probes through the solid imaging device.

13. (Currently Amended) A DNA reading apparatus as claimed in claim 11, wherein the light irradiation member irradiates both the plurality of types of DNA probes and the solid imaging device, the DNA probe is able to bond to an appropriate sample  
5 DNA having a fluorescent substance, the fluorescent substance is excited by the phosphor exciting light and emits a light is different in wavelength from the phosphor exciting light, and the phosphor exciting light of irradiated by the light irradiation member having has a wavelength in a range which excites a  
10 fluorescent substance that labels a sample DNA bondable to an appropriate one of the DNA probes but makes difficult for exciting does not sufficiently excite the solid imaging device in comparison with the light emitted from the fluorescent substance..

Claims 14-16 (Canceled).

17. (Currently Amended) A DNA reading apparatus as claimed in claim 12, wherein the light irradiation member irradiates both the plurality of types of DNA probes and the solid imaging device, the DNA probe is able to bond to an appropriate sample  
5 DNA having a fluorescent substance, the fluorescent substance is excited by the phosphor exciting light and emits a light is different in wavelength from the phosphor exciting light, and the phosphor exciting light of irradiated by the light irradiation

member having has a wavelength in a range which excites a  
10 fluorescent substance that labels a sample DNA bondable to an  
appropriate one of the DNA probes makes difficult for exciting  
but does not sufficiently excite the solid imaging device in  
comparison with the light emitted from the fluorescent substance.